

50 A YEAR

March 7, 1953

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SCIENCE NEWS LETTER

**Washington
subscription.**

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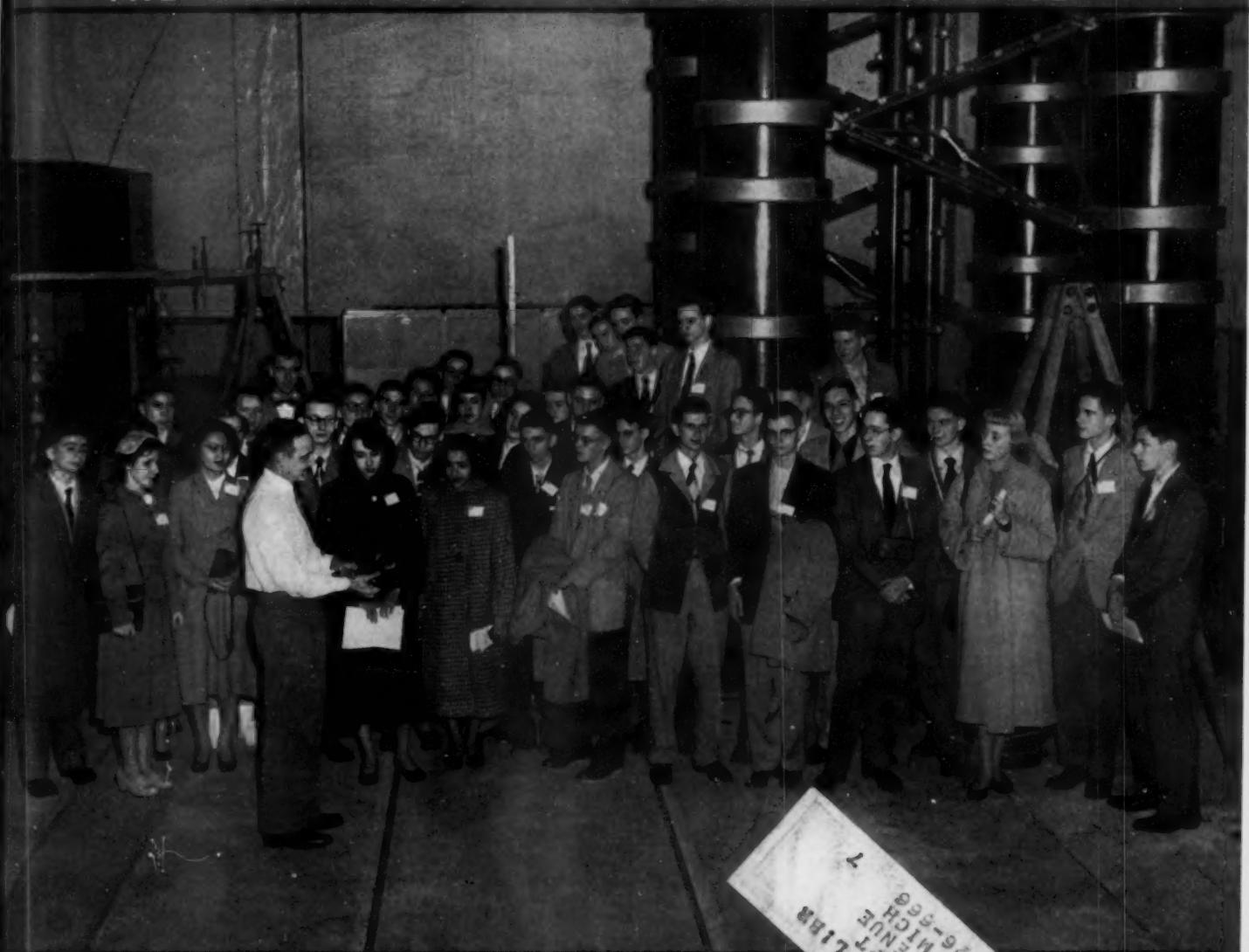
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THE WEEKLY SUMMARY OF CURRENT SCIENCE



Talent Search Winners

See Page 149

A SCIENCE SERVICE PUBLICATION

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DATE 06-13-2001
BY 60322 UCBAW/MLP



"Check your air, Sir?"



To keep voices traveling strongly through telephone cables, you have to keep water *out*. This calls for speed in locating and repairing cable sheath leaks — a hard job where cable networks fork and branch to serve every neighborhood and street.

At Bell Telephone Laboratories, a team of mechanical and electrical engineers devised a way to fill a complex cable system with dry air under continuous pressure. Pressure readings at selected points detect cracks or holes, however small. Repairman can reach the spot before service is impaired.

It's another example of how Bell Laboratories works out ways to keep your telephone service reliable — and to keep down the cost to you.



BELL TELEPHONE LABORATORIES

Improving telephone service for America provides careers for creative men in mechanical engineering



Air compressor and tank are at right. Long cylinders on rack dry air before it enters cables.

He's checking the air pressure in a branch cable, one of scores serving a town. The readings along the cable are plotted as a graph to find low-pressure points which indicate a break in the protecting sheath.



Master meters keep watch over the various cable networks which leave a telephone office in all directions to serve a community. Air enters the system at 7 pounds pressure, but may drop to 2 pounds in outermost sections—still enough to keep dampness out.

CHEM

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CHEMISTRY

Brain Chemistries Differ

Brain tissue taken from lobotomy patients is showing differences in chemical actions between those of rats and guinea pigs and humans, particularly in handling of glucose.

► SOME BASIC ideas about the chemistry of the human brain are being changed in research at the University of California School of Medicine, San Francisco.

The studies are being made with brain tissue removed from mentally ill patients receiving lobotomy operations.

Until recently most conceptions about human brain chemistry came from test tube studies of rat and guinea pig brain tissue because "living" human brain tissue has been difficult to get for test tube studies.

Now Dr. H. W. Elliott and V. C. Sutherland of the University find big differences between rat and human brain chemistry. The biggest difference is in the way human and rat brain tissue handles glucose, a common sugar which is apparently the main fuel for the brain.

Research had shown that fresh rat brain tissue in a test tube will deteriorate rapidly if glucose is not placed in the solution. It was assumed that the same thing would happen to human brain tissue.

But the California scientists found that fresh human brain tissue will respire, or "breathe," at a fairly high level for three hours in the test tube without the addition of glucose.

This indicates that there must be some substance in the human brain tissue capable of keeping up respiration which is either not present or is incapable of doing the same job in rat brain.

Further experiments pointed to glutamate, an amino acid salt, as the possible sustaining substance. In separate experiments, glutamate kept respiration up in the human brain just as high as glucose could. Glutamate will not do the same thing in rat brain tissue.

Since glutamate is the building block of proteins, the scientists figure that proteins may provide more energy for the brain than has been supposed.

This conclusion ties in with clinical studies on hypoglycemia, induced by insulin shock, in which the system suffers a shortage of sugar. Glucose was the only thing that could bring patients out of such shocks until a physician found that glutamate would do the same thing.

The studies were made by putting brain tissue in a nourishing solution in a test tube, then pumping pure oxygen through the tube so the fresh tissue could stay "alive" and "breathe." Conditions in the tube were changed by adding substances like glucose, glutamate, and various other chemicals. A measure of oxygen consumption by the tissue told how the different substances affected the tissue.

The scientists said the brain tissue from the mentally disturbed patients appeared to be normal in structure, and no differences in test tube function were noted from one mental condition to another. However, the existence of "biochemical lesions" which might contribute to both the psychotic condition and abnormal chemistry cannot be completely discounted.

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AERONAUTICS

20,000 Miles-Per-Hour Jet Flights Predicted

► JET PLANES may be flying "in the foreseeable future" at speeds of 20,000 miles an hour, a New York University aeronautical professor stated in New York.

This is 2,500 miles an hour faster than rocket expert Dr. Wernher von Braun figures an object must fly to escape from the earth's gravity into space.

Speaking on the "Future of Jet Propulsion," Prof. Frederick K. Teichmann, head of New York University's Guggenheim School of Aeronautics, predicted that future jet engines may develop so much power they could propel a plane at speeds approaching 20,000 miles an hour—more than 15 times the speed of the rotation of the earth at its equator.

The jet engines would develop about 500,000 pounds of thrust, which is about 125 times the power of today's greatest piston engines, he predicted.

But such high-powered engines will not be particularly useful unless science can figure out how to get around the problem of heat created by air friction when a plane flies in the supersonic speed range.

At 40,000 feet and at speeds of 1,300 miles an hour, a plane's inner and outer surfaces may get hotter than 200 degrees Fahrenheit. Unless counteracted by some refrigeration scheme, the heat will weaken most metals now being used. Titanium seems to promise the 20th-century jet pilot a plane that can zoom around faster than planes now made of aluminum or magnesium alloys.

Prof. Teichmann also foresees the day of pilotless cargo planes that will spirit garden tools and pianos from the factory to the salesroom in short order. The planes, capable of flying global routes, also may carry airmail.

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LARGEST AUTOMATIC GUN—The Skysweeper, a new 75 mm. anti-aircraft gun, has radar and computer mounted integrally with the weapon for quick and accurate spotting, tracking and interception of low-flying, high-speed enemy aircraft. Usable in all types of weather, the "artillery machine gun" can fire 45 twelve and one-half pound shells a minute. It was developed by Army Ordnance.

GENERAL SCIENCE

Biblical Flying Saucers

► FLYING SAUCERS, much in the news during recent months, have been seen throughout the ages. There was a flying saucer scare in 1897, a great cigar-shaped saucer was seen in 1882, and thousands of years ago the Hebrew prophet Ezekiel witnessed flying saucers.

Dr. Donald H. Menzel, professor of astrophysics at Harvard College Observatory, reports that the prophet Ezekiel was a top-flight scientific observer and recorder of important meteorological phenomena. A detailed study of the Biblical text describing his vision of wheels within wheels indicates he was observing the well-known solar halos complete with mock suns and "glories," a phenomenon produced by ice crystals in the sky.

The "four living creatures" would have to be mock suns, Dr. Menzel states. The arms of the cross, centered on the sun, probably looked like the spokes of a wheel and each bright spoke formed the body of a figure with the mock sun itself representing the head.

On the night of Nov. 17, 1882, one of the greatest flying saucers of modern times sped across the heavens. This cigar-shaped affair was the best-observed flying saucer in history as a number of distinguished scientists

reported having seen it. The apparition was probably an auroral display or associated with it, Dr. Menzel points out, for high magnetic activity was recorded then.

Some 55 years ago, before airplanes began to fly and shortly before dirigible balloons came into being, the inhabitants of Oakland, Calif., spotted flying above them a sort of winged cigar, projecting a stream of brilliant light from its head. It was reported as moving rapidly, "going at least 20 miles an hour."

This earliest version of the airship is stated to have gradually moved east. Several months later it apparently reached Salt Lake City, then Denver, Omaha and Kansas City. Many claimed to have seen it or to have known someone who had constructed it or flown it. Pictures claimed to have been taken from the machine while in the air were shown and a letter reportedly dropped from it was found. It was the electrical wizard Thomas A. Edison who broke this airship bubble.

Other early examples of flying saucers and their probable explanation in the light of modern scientific knowledge are given in Dr. Menzel's book, "Flying Saucers." (See SNL, Feb. 28, p. 140.)

Science News Letter, March 7, 1953

MEDICINE

Gene Stuff Is Virus-Like

► A VIRUS-LIKE action of cancer cell gene material has been discovered by Drs. Abraham Cantarow, Joseph Stasney and Karl E. Paschke of Jefferson Medical College, Philadelphia.

The finding was made when these scientists succeeded in inducing lymphatic cancers in rats by injecting gene material from cancer cells. The American Cancer Society, which announced the finding, describes the work as follows:

The scientists extracted the gene material by mincing the cells, spinning the mince at different speeds and separating the spun down portions. They tested the homogenate against the presence of whole cells by pipetting into it 100 whole cells. Because they could detect each of the hundred cells—and no others—in the mince, they were convinced that similar minces had no cells.

When they injected the gene mince under the skins of rats, about 40% of the animals quickly developed cancers of the lymphatic tissues.

Now the scientists have found that the 60% which did not develop cancer when treated with the mince do not develop it when they are injected with whole cancer cells either. They seem to be rendered resistant to this type of cancer.

They also have found that some of the animals develop cancer only for a short

period. Then the cancer disappears. When the rats again are injected either with mince or whole cells, they prove immune. No sign of cancer arises from the second treatment.

The scientists now are trying to separate out of the mince the specific chemical substances responsible for production of the cancer.

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GEOPHYSICS

Rock "Flow" Process Duplicated in Laboratory

► THE PROCESS by which heat and pressure, deep within the earth's crust, deform rocks and cause them to "flow" has been duplicated for the first time at the University of California at Los Angeles.

Long a puzzle to geologists, the mechanism of deformation was found by David Griggs, Hugh Heard and Norman Coles. Their experiments were performed at temperatures up to 750 degrees Fahrenheit and at pressures of 75,000 pounds per square inch, conditions approximating those at a depth of 10 miles in the earth's crust.

The research indicates that the mechanism of deformation in marble involves two processes: 1. shearing within the individual

crystals without loss of cohesion, and 2. displacement at the boundaries of crystal grains by recrystallization, a molecular action similar to melting and refreezing.

Previous laboratory deformations of marble have been accomplished, Prof. Griggs points out, but this is the first time crystal-line structure has indicated laboratory processes have approximately duplicated natural ones.

This is borne out in microscopic studies of thin sections of the marble by Dr. Frank Turner and Iris Borg of the University of California, Berkeley. These reveal a crystal-line structure very similar to that of rocks deformed in nature.

Science News Letter, March 7, 1953

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LOADING FLYING BOXCAR—One of the fleet of large cargo planes used to airlift supplies to our combat forces in the Far East is shown here being loaded with a 105-mm howitzer. The plane is the U.S. Air Force C-119 "Flying Boxcar."

ELECTRONICS

Blood Flow Measured

Newly developed electronic device measures flow of liquids, including surge of blood in veins and arteries without use of surgery. Operates ultrasonically or in audible range.

▶ AN ELECTRONIC gadget has been invented that permits doctors to measure, without surgery, blood flow in veins of the body lying near the skin.

Even when the blood vessel lies deep within the body, a projected refinement of Henry P. Kalmus' electronic flowmeter is expected to eliminate the need for cutting into the body.

As it is, the vein or artery itself does not have to be cut into, explained Mr. Kalmus, a scientist at the National Bureau of Standards. Two tiny crystals, each no bigger than a pea, can be laid right on the blood vessel when a doctor wants to know how fast, or how much, blood is surging through the vessel.

The crystals, made of material much like that used in home phonograph pickups, alternately send out sound waves that are received by the "listening" crystal of the pair after the sound has gone through the blood.

Then the crystals reverse their roles and the first "listens" while the second sends the sound waves. Through electronic equipment, the received and transmitted sounds

are compared to reveal the speed of blood flow in the vein or artery.

When the size of the blood vessel is known, the instrument can be used to tell how much blood is pulsing through the artery or flowing through the vein. This information is valuable in the study of battle-wounds and frostbite, to mention a few applications. It also provides valuable knowledge to doctors probing the acceleration problems that surround pilots flying supersonic jet planes.

The Kalmus flowmeter gets around some disadvantages of many present types. The two crystals do not have to be spaced accurately; in some present instruments, spacing is critical. Neither must the temperature of the gas or liquid under study be controlled carefully.

When the flowmeter is being used to measure liquid flow, the tiny crystals emit ultrasonic sounds. But they send out sounds largely in the audible range when a gas, such as air, is under observation.

In addition to its biological and medical applications, the flowmeter can be used to measure the speed of ships and aircraft. As

a speedometer for airplanes, it should be less "clumsy" than present mechanical devices.

The device also can be used to measure the flow of rivers to show civil engineers how to harness the rivers to prevent disastrous spring floods. Air conditioning engineers also can use it to study minute drafts in houses, Mr. Kalmus reported.

The flowmeter was demonstrated to the 40 winners of the Science Talent Search when they were in Washington.

Science News Letter, March 7, 1953

GENERAL SCIENCE

Talent Search Winners Visit Bureau of Standards

See Front Cover

▶ THE 40 top young scientists attending the Twelfth Science Talent Institute are shown on the cover of this week's SCIENCE NEWS LETTER in a photograph taken during their tour of the National Bureau of Standards, after a welcoming speech by Dr. A. T. McPherson, associate director.

John H. Parks of the high voltage laboratory at the Bureau is explaining to the young students some of the work being done in his division. Shown in the right background of the picture is part of the surge voltage generator, capable of producing up to 2,000,000 volts, which is used to develop new test methods for measuring high voltage surges.

In his hand Mr. Parks is holding one of the high voltage insulators used to compare the ability of high voltage insulators to withstand direct lightning storm flashes.

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BIOCHEMISTRY

Keep Livers Alive for Hours, Probing Artery Ill

▶ ANIMAL LIVERS are now being kept alive outside the body for six to eight hours in laboratories of the University of Rochester School of Medicine and Dentistry, Rochester, N. Y.

As a result, scientists believe they can get important clues to possible diet and gland causes of artery hardening.

The livers are kept alive by mechanically circulated oxygenated blood, Prof. Leon Miller reported to the American Chemical Society.

These test tube livers can continue to make blood plasma components which can be identified by radioactive tracer methods and related to certain diseases, Dr. Miller said.

The lipoproteins of the plasma, now the center of interest in the attack on artery hardening, are made in the liver, Dr. Miller finds. So are almost all other plasma proteins except the gamma globulins which are closely related to the body defenders called antibodies.

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PHYSICS

Work "Unusable" Metal

Alloy of aluminum and iron changed from laboratory curiosity to usable metal by high heat, and it can then be cold-rolled. Has excellent "soft" magnetic properties.

► A HERETOFORE "unusable," rock-hard magnetic material can now be worked, the U. S. Navy revealed, promising size and weight reduction of some airborne equipment, better home tape recorders and improvement of electronic "brains."

The metal, 16-Alfenol, an alloy of aluminum and iron, was shown in an on-the-spot demonstration to 40 winners of the national Science Talent Search at the Naval Ordnance Laboratory near Washington.

Merely by heating the material to a temperature of 1,067 degrees Fahrenheit, it can be changed from a laboratory curiosity into a usable metal of great strategic value to the U. S. It can then be subjected to a cold-rolling process that does not harm its desirable properties.

Although Japanese scientists previously had noticed that a 16% aluminum-84% iron combination showed excellent magnetic properties, they were baffled by the metal's extreme brittleness and unworkability.

But Navy scientists in NOL's magnetics division learned how to make the atoms of aluminum slip into place among atoms of iron in such a way that the metal could be turned out as a flexible ribbon only 25 ten-thousandths of an inch thick.

The resulting material shows excellent "soft" magnetic properties. That means a tiny electric current can magnetize the metal easily, but that the metal will not hold its magnetism very well after the current has been turned off.

Carroll W. Lucy, head of the magnetics division, hailed the new process as "one of the most significant developments in the field of soft magnetic materials in a long time."

He pointed out that the material does a better job in certain applications than silicon steel now widely used in transformer cores. Furthermore, it is lighter and comes out of the process with a ready-made insulation. Silicon steels usually must be insulated in a separate process before they can be used in transformer cores.

The metal shows further promise where high frequency electric current is involved. Thus 16-Alfenol, named after its non-critical chemical components, aluminum and iron, and the Naval Ordnance Laboratory, may work well in giant electronic computers which solve fantastic problems in split seconds.

Because of its great resistance to undesirable electric currents set up in transformer cores, the new material also should allow a weight reduction in transformers and similar equipment needed in aircraft. This, in turn, could improve the performance of Air Force planes.

But even though the metal is ductile after being worked, it still retains its hardness. This means that the metal "may be a natural" for magnetic tape recorder heads which wear down slowly as miles of tape scrape over them.

Science News Letter, March 7, 1953

NATURAL RESOURCES

Water-Grabbing Plants

► WATER-WASTING PLANTS are grabbing off up to 25,000,000 acre-feet of water per year in 17 western states, T. W. Robinson of the U. S. Geological Survey reported to the Geological Society of Washington.

Phreatophytes, useless trees and shrubs whose roots reach into or near the water table, are responsible for this useless water consumption. They cover about 16,000,000 western acres and squander an amount of water about twice the average flow of the Colorado River at Lees Ferry, Ariz.

Some 50 species of plants—including alder, cottonwood, mesquite, willow, saltcedar and saltgrass—make up the phreatophytes. They pump up or lift ground water, sometimes from great depth, and dissipate it as vapor into the air.

Such "consumptive waste" probably represents the "largest source of reclaimable water in the arid western states," Mr. Rob-

inson said, summing up many years' work on the water-wasting plants.

Use of chemical sprays, such as 2,4-D and 2,4,5-T, is a promising and relatively inexpensive method of destroying the phreatophytes over large areas.

Not all phreatophytes are water grabbers. One, alfalfa, is an important agricultural plant. His waste figures, Mr. Robinson pointed out, do not include water used by alfalfa and other beneficial plants.

Salvage of the wasted water is divided into two basic operations: (1) Reduction of waste, by rapid lowering of the water table either with pumps or by drainage, thus depriving the roots of water; and (2) Increased efficiency of use, as by substituting plants of high economic value, such as alfalfa, for those of low economic value, such as cottonwood.

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• RADIO

Saturday, March 14, 1953, 3:15-3:30 p.m. EST
"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. William T. Sanger, president of the National Society for Crippled Children and Adults, president of the Medical College of Virginia, Richmond, discusses "How Easter Seals Help Crippled Children."

CHEMISTRY

Protein Structure Secret Is Unraveled by Chemists

► UNRAVELING OF the secret structure of proteins, the basis of life, has been carried one step further in the laboratories of Drs. Linus Pauling and Robert B. Corey at the California Institute of Technology.

Nucleic acids have been found to have a complex twisted form, in which three spring-shaped molecular chains are intertwined.

Understanding the structure of proteins and nucleic acids will make it easier to make these life materials artificially, or to understand disease processes involving living tissues.

Nucleic acids are chemically simpler structures than hair and feathers. Those tissues, which are modifications of skin cells, were recently analyzed by the same scientists. (See SNL, Jan. 31, p. 57.) They were found to have spring-like, helical shapes. Nucleic acids have now been found to have shapes somewhat similar.

Hair and feather molecules combine a left-hand twist of individual strands with a right-hand twist of the whole rope-like fiber. Nucleic acids, on the other hand, are reported to have about 24 molecular groups strung on seven turns of the helix, which is twisted like a right-hand screw.

Location of the individual molecular groups has been mapped by Dr. Pauling and his assistant. He will report his complete findings soon, both by publication and in person to the National Academy of Sciences in Washington.

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GEOLOGY

New Uranium Mineral Discovered in India

► A NEW radioactive mineral containing uranium and thorium has been discovered in India, geologists S.H.U. Bowie and J.E.T. Horne have told the British Department of Scientific and Industrial Research in London.

The mineral contains 31% thorium oxide and 4% uranium oxide, both radioactive materials. The deposit is much too small to be of commercial importance.

Finds of new mineral species are extremely rare. This one is called cheralite. For Chera, the area in India where it was discovered, and it is closely related to monazite, the commonest ore of thorium.

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AERONAUTICS

Long-Range Work Plane Can Use "Short" Runway

► A HIGH-FLYING, more economical work plane has been created at Lockheed Aircraft Corporation to give the Air Force a long-range personnel and cargo carrier that can take off and land on "short" runways.

Powered by four turbo-prop engines, the plane is designed to fly assault and ground-support missions. Performance details of the C-130, as it is called, are secret, but it is said to "fly faster and higher than any current military transport."

Prototypes now are being built at Lockheed's factory at Burbank, Calif.

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INVENTION

False Wall Helps Polio Patients in Rocking Bed

► TO MAKE it easier for polio-stricken patients to read in rocking beds sometimes used in place of iron lungs, a North Carolina inventor has attached a false wall to the end of the bed. The wall comes complete with wallpaper and hung pictures.

H. A. Doll, an employee of Bell Telephone Laboratories, Burlington, N. C., reports his invention seems to work fine. The false wall, which goes up and down as the bed rocks, eliminates the distraction caused otherwise by the regular room wall which appears to the rocking patient to oscillate up and down while he reads.

Science News Letter, March 7, 1953

MEDICINE

New Penicillin Fights Both Boils and Typhoid

► DISCOVERY OF a new type of penicillin was announced by Drs. E. P. Abraham, G. G. F. Newton, K. Crawford and H. S. Burton of the University of Oxford, and Dr. C. W. Hale of the Medical Research Council's Antibiotics Station at Clevedon, England.

The new type of penicillin is called Cephalosporin N. It is one of two antibacterial substances produced by a fungus of the species *Cephalosporium*.

Cephalosporin N differs from common penicillins in its water-absorbing character and in its antibacterial activity. For example, it is equally active against a strain of *Staphylococcus aureus*, the germs that cause boils, and against a quite different germ, *Salmonella typhi*, that cause typhoid fever. But benzylpenicillin is more than 100 times as active against the staphylococcus germs as against the typhoid germs.

The new type of penicillin, reported in *Nature* (Feb. 21), may be the same as a previously reported antibiotic synnematin, produced by other members of the *Cephalosporium* family.

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NEW ASSAULT FREIGHTER—A scale model of the first U. S. turbo-prop transport, to be used for assault and ground support missions by the U. S. Air Force, is shown in the photograph.

MEDICINE

Foundation Buys Globulin

► WORRIES OVER a black market in gamma globulin for preventing polio paralysis next summer can be set at rest. The gamma globulin which supposedly was being bought and hoarded by some doctors for use next summer was reported to be coming from commercial supplies.

Now it is announced that the National Foundation for Infantile Paralysis will buy all the gamma globulin now on hand and being produced through June 30, 1954, by five of the nation's leading pharmaceutical houses. This presumably will take the entire commercial supply, leaving none for black marketing.

The purchase, for which \$11,000,000 will be spent, is not just to stop any black market operations. Commercially produced gamma globulin may or may not contain antibodies to all three polio viruses. It has not been tested for this and authorities doubt that it does since it is made from relatively small pools of blood. Gamma globulin from blood donated to the American Red Cross comes from large pools, has been tested and does contain antibodies to all three polio viruses.

Commercially produced gamma globulin, however, does contain anti-measles antibodies. So, even if tests now planned show it ineffective against polio, it can be used against measles, leaving all the effective anti-polio gamma globulin for polio protection. This commercial supply, purchased

by the National Foundation, will be turned over to the Office of Defense Mobilization for allocation.

Meanwhile, the Red Cross has turned over to the Office of Defense Mobilization enough gamma globulin for 245,000 average polio shots. ODM will distribute the material nationally for use this summer to aid in prevention of paralysis from poliomyelitis.

The Red Cross will continue to turn over to ODM all supplies of gamma globulin as they come from the processing laboratories. The Red Cross is collecting the blood and paying for fractionation, processing into gamma globulin and packaging.

If doctors throughout the nation are, as reported, buying up available supplies of gamma globulin to hoard for black market sales later, the American Medical Association would take action.

Dr. Louis H. Bauer of Hempstead, Long Island, A.M.A. president, told *SCIENCE SERVICE* such a situation would be "disgraceful" and if true, he "would thoroughly disapprove of it."

Neither he nor A.M.A. headquarters in Chicago, however, had heard of such a situation.

Science News Letter, March 7, 1953

It now seems highly probable that the population of the U. S. will increase by 50% in the next 50 years.

PSYCHOLOGY

Testing Children For Their Attitudes

► PSYCHOLOGISTS OFTEN give a child tests other than intelligence tests to learn why he is not doing well at school or is a problem child at home.

From these other tests, clues are gained concerning how the child feels, how he sees the world around him and how he reacts to it. One of these tests is the Rorschach Ink-Blot Test, as it is generally known. Miss Lillian Mould explains this and some other attitude tests in *Understanding the Child* (Jan.).

The Rorschach test, she says, "is deceptively simple, consisting of ten ink blots, five of black ink, and five of colored ink. Through classifying the kinds of responses, a picture of the personality is gained. Study of the responses reveals frequently the area around which emotional problems center, and also how deep-rooted these are."

"In addition to the Rorschach, another test is used frequently which reveals specific attitudes towards key people in the child's life. This is called the Thematic Apperception Test, "T-A-T," and is a series of pictures of various scenes, about each of which the child is asked to make up a story. These pictures elicit expression of attitudes to members of the family, to authority, to people of the same sex and of the opposite sex. Through these stories, strivings and goals are also revealed. They are especially helpful with adolescents.

"For younger children the Children's Apperception Test, "C-A-T," has been developed, using animals instead of human figures for the subjects of the pictures, as children generally identify more readily with animals."

Science News Letter, March 7, 1953

MEDICINE

Jaundice Cutting Blood Supply by Two Percent

► THE NATION'S supply of blood donated to the Red Cross for the armed forces and for gamma globulin for polio and measles prevention would be richer by at least two percent except for jaundice.

The loss runs to about 2,000 pints of blood a week, maybe more.

The figures come from a report by Drs. Paul P. McBride and George W. Hervey of the American National Red Cross in Washington to the *Journal of the American Medical Association* (Feb. 28).

In order to minimize the spread of viral hepatitis, liver ailment usually marked by jaundice, the Red Cross asks prospective blood donors whether they have ever had jaundice and whether they have had contact with it in the past six months. Blood is not taken from prospective donors if they answer yes to either question.

Figures covering a two-week period from Red Cross blood and processing centers in 59 regions distributed from coast to coast

showed that 1.94% of all prospective donors were eliminated because of a history of jaundice or jaundice contact.

Many more may have eliminated themselves from learning that a history of jaundice would be a barrier to acceptance as blood donors.

Some may have been eliminated because they once had jaundice due to gallbladder trouble, which would not mean that their blood carried the hepatitis virus.

The approximately two percent eliminated at donor stations represents, the doctors point out, "an important additional supply of blood fractions if proper precautions are taken to avoid risks to staffs handling the blood and to the ultimate recipients of the fractions."

Tests have shown that the albumin and globulin fractions of blood, which are the ones most used at present, do not transmit the hepatitis virus.

Science News Letter, March 7, 1953

SURGERY

Surgery Treats Two Adrenal Gland Diseases

► GOOD RESULTS in surgical treatment of two kinds of adrenal gland diseases are reported by Drs. Randall G. Sprague, Walter F. Kvale and James T. Priestley of the Mayo Clinic, Rochester, Minn., in the *Journal of the American Medical Association* (Feb. 21).

One of these diseases, called pheochromocytoma, is a condition in which there is an overfunctioning tumor of the inner part of an adrenal gland. These tumors cause sustained high blood pressure.

The other disease is called Cushing's syndrome. High blood pressure also occurs in this condition. Patients, who are almost always women, have very fat faces, necks and trunks with thin arms and legs, porous bones and weak muscles. Sex gland disturbance or failure, acne, hairiness and thin skins are other symptoms.

In pheochromocytoma the operation consists in removing the tumor. In Cushing's syndrome, the Mayo Clinic surgeons remove all of one and most of the other adrenal gland. Their reason for this is that the symptoms are the immediate consequence of overfunctioning of the glands, so, regardless of what causes the overfunctioning, removal of much of the tissue should relieve the symptoms.

Results of the operation show that this reasoning is correct. Since 1945 the operation has been performed on 50 patients. Of these 41 are now alive, 40 of them in a state of satisfactory freedom from symptoms.

Pheochromocytomas have been removed from 25 patients with "gratifying" results in "virtually all cases," the doctors report.

Cortisone, famous hormone produced by the adrenal gland, and modern methods of preparing patients for operation and caring for them immediately afterwards are credited for the good results in the operation which once would have been fatal.

Science News Letter, March 7, 1953

IN SCIENCE

PSYCHOLOGY

Quicker Talking Found Intelligible

► RECORDED MESSAGES like the telephone weather prediction could be speeded up in transmission as much as two and one-half times the original speech without much loss in clarity.

Success with a new method for chopping and splicing a recording tape so as to cut down on transmission time is reported by Dr. William David Garvey of the Naval Research Laboratory in the *Journal of Experimental Psychology* (Feb.).

Other methods of accelerating speech have been tried previously. One was to have the speaker talk faster, but when a person tries to speed up his speech he does not pronounce his words so clearly and the meaning is lost.

Another method was to run the tape or the record faster, but as anyone knows who has tried to speed up the old-fashioned phonograph, this makes the pitch higher and a bass voice comes out as a squeaky soprano. Acceleration by this method was possible only up to 1.67 times the original speech speed. Beyond that it was better to chop chunks out.

Pieces of the tape as long as 2.5 centimeters could be chopped out without significantly affecting intelligibility, it was found. More than half the speech pattern can be chopped out without loss of meaning.

No immediate military use for the chop-splice accelerating method was mentioned by Dr. Garvey in his report. It is possible, however, that it may find application in broadcasts of recorded information for guiding aircraft.

Science News Letter, March 7, 1953

PSYCHOLOGY

Anxious? Heart Slows Down, Not Speeds Up

► ANXIETY CAUSES a slow-down rather than a speed-up of the human heart rate. This finding, contrary to popular opinion, was announced by Drs. William N. Schoenfeld, Joseph M. Notterman and Philip J. Bersh of Columbia University psychology department, New York.

The finding was made with a specially devised conditioned reflex test of 250 male students at Columbia. The research was done with support by the Air Force's School of Aviation Medicine, Randolph Field, Tex. The Air Force interest is said to come from concern that highly trained jet pilots could become physiologically handicapped, without being aware of it, because of their hearts' reaction to anxiety.

Science News Letter, March 7, 1953

ENE FIELDS

PLANT PATHOLOGY

Find Banana Disease Hides Out in Wild Plants

► PANAMA DISEASE, a fungus-caused wilt that threatened to wipe out much of the Central American banana industry a few years back, may defy eradication by "hiding out" in wild plants near banana fields.

B. H. Waite and V. C. Dunlap, working at the United Fruit Company research laboratory in La Lima, Honduras, have discovered three native grasses and a shrub to be reservoirs of the Panama disease fungus, *Fusarium oxysporum*, they disclose in *Plant Disease Reporter* (Feb. 15).

Outbreaks of Panama disease almost ruined banana growing on Caribbean coast plantations some years ago, leading to a migration of the industry to the Pacific side of Panama and Costa Rica.

Vigorous preventive measures have partially restored productivity in the affected areas, but hidden sources of the disease have defied complete control. Finding the wilt associated with native plants may give a clue to final conquest of the disease.

Science News Letter, March 7, 1953

AERONAUTICS

Space Suits Outmoded By Pilotless Missiles

► SPACE SUITS, Navy or Air Force version, may soon be as old-fashioned as the top hat became after President Eisenhower placed a homburg on his head.

Experts in high flying are already predicting that a human being is too slow in his reflexes, too vulnerable to damage even in a space suit to go along for the ride way above the wild blue yonder the Air Force has been singing about. Space flight will be taken over by electronic brains and telemetering devices in guided missiles, while the "pilot" sits comfortably on the ground. What he wears on the ground will have nothing to do with the performance of these pilotless space ships.

Students of "space medicine," a new branch of medicine being investigated by the Air Force at Randolph Field, Tex., have their doubts as to the ability of the frail human being to take it between the earth and the moon. The sense of balance, which keeps us on our two feet, will be seriously affected by the loss of gravity experienced in a space flight.

Little is known about the effects of the cosmic rays that bombard our atmosphere. Many are stopped before they get to the ground by the ionosphere. The few which reach us go right through us, but do us no

harm. What this form of radiation would do to humans above the protecting envelope, whether inside space suits or not, is not yet clearly known.

Even at comparatively low levels, where the combat of the next big war might take place, some engineers think pilots are too slow. Combat above 50,000 or 100,000 feet might well be between guided missile bombers and guided missile fighters. Present space suits protect pilots against some sharp turns, but guided missiles without human beings could turn on a dime, suddenly increase or decrease acceleration to an extent that no practicable space suit could ever protect against.

All these developments are a few years away yet. In the meantime, pilots who fly high and fast will need some sort of protection in the form of space suits. But they are probably only a passing fad.

Science News Letter, March 7, 1953

MEDICINE

New Anti-TB Drug Cures Disfigured Skin

► TWO WOMEN who for more than 30 years suffered from a disfiguring tuberculous skin condition that defied other methods of treatment have been apparently cured by the new anti-TV drug, isoniazid. The disease is lupus vulgaris.

Their cases are reported by Drs. Lawrence C. Goldberg and Claudia R. Simon of the University of Cincinnati College of Medicine in the *Journal of the American Medical Association* (Feb. 21).

Whether the skin condition will come back after the drug has been stopped is not known yet. The improvement, called "dramatic" both in clinical results and in microscopic examination of the skin tissue, came within a few months of treatment. The skin still showed the scars of the disease, however.

Science News Letter, March 7, 1953

ZOOLOGY

Explorers Plan New Guinea Trek

► THREE EXPLORERS will leave New York for the rain forests of New Guinea this month for a nine-months' expedition collecting animals and plants of this little-known region.

Leader of the expedition is botanist Leonard J. Brass, who has made three previous trips of exploration into the New Guinea area. His assistants will be zoologists Geoffrey M. Tate and Hobart M. Van Deusen.

The expedition is the fourth of a series to study the relationships among the plant and animal life of New Guinea, Malaysia and Australia. It is co-sponsored by Richard Archbold, the American Museum of Natural History, the Arnold Arboretum of Harvard University and the Office of Naval Research.

Science News Letter, March 7, 1953

CONCHOLOGY

Beautiful Shells House Deadliest Creatures

► AMONG THE deadliest creatures on earth are a half-dozen species of beautiful seashell animals from the South Pacific and Indian Oceans. These mollusks, akin to the cone-shaped seashells of American beaches, have a poison as virulent as that of a rattlesnake.

The Smithsonian Institution recently added several species of cone shells from Australia and the Marshall Islands, including poisonous varieties, to its collection.

In the past 50 years a score of human deaths have been caused by stings of the poisonous cone shells, the Smithsonian Institution said. The poison acts on the nervous system and death may result in a few hours.

Although all known cone shells have poison, only about six are deadly to man. The American cones have never been known to sting a human.

Science News Letter, March 7, 1953

MEDICINE

Eyelid Cancers Yield To Radiation Treatment

► GOOD RESULTS in treating cancer of the eyelids with radium and X-rays are reported by Dr. Bertil Roseberg of the Rockford Memorial Hospital, Rockford, Ill.

The overall healing rate was 85.3%, or 87 out of 102 cases. All were followed for three or more years after the last treatment. Dr. Roseberg believes all recurrences of such cancers come within three years following initial treatment.

His study was made at the State University of Iowa Hospitals, Iowa City, and is reported in the *American Journal of Roentgenology, Radium Therapy and Nuclear Medicine* (Feb.).

Dr. Roseberg pointed out that cancer of the eyelids may cause severe changes in the function of the eye and underlying tissues, and loss of vision in the involved eye and even loss of life may result.

He stressed the importance of preserving the function of the eye and its adjoining tissue while at the same time removing the cancerous lesion completely.

The most common type of cancer of the eyelid may develop either as a small non-ulcerating lump with or without a central depression, or it may begin secondary to a keratosis, a horny growth, which usually ulcerates early.

There are few subjective symptoms until the lesion has reached about .3 or .4 of an inch in size and has involved other parts. The patient may then complain of a scratching or burning sensation, reddening of the eye or increased flow of tears. Because of the mild symptoms and slow-growing nature of the tumor, patients frequently delay seeking medical aid.

Science News Letter, March 7, 1953

GENERAL SCIENCE

Manpower and Human Talents

Proper utilization of manpower includes use of many of the same techniques involved in picking Science Talent Search winners. Industry also uses similar methods.

By DR. LEONARD CARMICHAEL

Secretary, Smithsonian Institution

Address delivered at the Awards Banquet of the Science Talent Institute in Washington, March 2.

► THIS IS not an ordinary banquet. We are not met here to celebrate something that is past. We have gathered together this evening in honor of the high promise for the future of the young scientists who are here this evening.

Science is a strange thing. It, too, is always concerned with the future. Cynics say that those who are professionally concerned with political history often try to back into the future while their eyes are fixed on things as they have been. This is never the way of science. It is in the very nature of real research and true investigation to extend what is known. Science is always pushing back darkness.

It is an especial pleasure to address you this evening because you are recruits for the special group of men and women in our society who will continue this forward surge of science. Some of you may have been called many things in the past. In Washington in 1953 you, the young and promising scientists of America, are termed a manpower resource.

Present Manpower Problem

As your toastmaster has said, for a number of years I have had something to do with the listing and classification of our nation's scientists. It may not be wholly inappropriate, therefore, for me to ask you this evening to think with me a little about what is technically called the manpower problem of our Korean war period.

The field of proper manpower utilization is itself a scientific field. It is a subject, however, in which high policy and political theory as well as objective fact play a large part in the determination of national action. Because of the low birth rate during depression years about 25% fewer youths reach the age of 18 each month now than was true 10 years ago. This means that now a higher proportion of our population than was formerly the case is now in the older age groupings.

If we think of the nation's manpower needs we find the following five categories: (1) military manpower; (2) civilian manpower needed to support our necessary mili-

tary establishment; (3) civilian manpower needed to support the health, welfare and safety and the essential aspects of our civilian economy; (4) the manpower needed to provide the nation's population with the pleasures, satisfactions and recreations of life; and (5) the manpower needed to maintain our foreign commitments as the world's leading nation. The hard fact can be stated simply. There are not enough intellectually able, physically competent individuals of proper age to provide the men and women needed for the services and functions included in the five categories just given.

What I have just said indicates why America today has a sharp manpower problem. When I use the word manpower let me emphasize the fact that I always mean womanpower as well.

Individuals Must Be Free

Anyone who first begins to think about the nation's population and its most effective utilization is tempted to deal with crude analogies. Such first thoughts about manpower solutions thus tend to be in terms of robots or guinea pigs instead of free American citizens. At the outset, therefore, let us agree that when we think about manpower utilization in this liberty-loving country of ours we will always think about free individuals.

A slave population can be ordered here and there by a dictator. But the very reason that we now have a manpower shortage is that we are determined that American citizens shall be treated as free and essentially sacred human individuals and not as pawns in a totalitarian game.

Never in peacetime, and only to the least possible degree in wartime, must America consider the ordering about our fellow citizens in an effort to bring about optimal labor utilization. This does not mean, however, that we need avoid the assembling of facts and the using of facts. Proper, detailed knowledge of manpower supplies and shortages will help free American men and women decide upon wise careers for themselves and for the nation's good.

It may well be that the enlightened self interest of our fellow citizens will assist them in bringing about the kind of distribution of manpower that will make our nation strong and our population happy if necessary facts are available when individuals must select careers.

Much progress has been made in recent

years in techniques for the selection and classification of human individuals in military, vocational and professional life. The very techniques that have been used in selecting you, the winners of this Talent Search, are in part the same techniques which can be and indeed are applied on a wider and wider scale in assisting individuals to find proper employment. Many wise American employers are now helped by the use of these same procedures to secure individuals who are best able to be trained to perform the tasks which are required in their organizations.

Military Manpower Selection

Because military manpower must often be suddenly recruited, rapidly assigned to new duties and then quickly trained, many of the new techniques for the selection and classification of individuals have developed in connection with the specific problem that our nation has faced in organizing its fighting forces for war.

Actually, as one of America's greatest physiologists, Dr. Wallace Fenn, has recently pointed out, the selection of military manpower is a very old problem. In the Bible, chapters 6 to 8 of the Book of Judges records a military selection procedure. Gideon was called upon to raise an army to smite the Midianites. He raised an army of 32,000 Israelites.

The Lord told him that this army was too large and that its success would be impaired by the cowards, we would now say the psychopaths, in its ranks. Gideon used a simple screening device. He told all those who were afraid to fight to go home. He was left with 10,000 men.

Gideon's Performance Test

The Lord again told Gideon that his army was still too large. He devised what we would now call a performance test. He selected those recruits who were most effective in the military operations of his day. He led his army to a river for a drink. He eliminated all those who carelessly threw down their shields and spears and lapped up the water like dogs. He retained only the 300 men who kept a wary eye on a possible enemy as with one hand they scooped up hasty gulps of water. These 300 men were the winners in the military talent search of their day.

Then Gideon proceeded to use a secret weapon. He must have had his military scientific research and development board. The 300 men were divided into three companies. A trumpet was placed in every man's hand and also an empty pitcher. A lamp was lighted in the pitcher. When at night the 300 surrounded the enemy at a given signal they broke their pitchers, ex-

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posed their lamps and blew their trumpets. The terrified enemy ran and a complete victory was achieved.

This ancient story has many morals. It suggests that after proper selection and classification a small group of individuals can do more than a less well selected mob. You will notice that in this story self-selection played an important part. Aptitude and individually recognized interest are as true today as they were when Gideon lived in providing one basis for good selection of people for any job.

Modern Selection Procedures

An almost equally miraculous account of success of a modern selection of a fighting force has recently been given by Capt. P. E. McDowell of the United States Navy. He has described the procedures by means of which the battleship New Jersey was provided with its full complement of officers and men after its commissioning. This new vessel had to be outfitted when it was turned over to the Navy, with 2,700 enlisted men and officers. Ninety days was allowed to teach these men their new duties and to give them the necessary skills as a working team to man the great fighting vessel.

This staffing operation was conducted during the second World War. It required great speed and efficiency. The vessel was desperately needed for service with the fleet. Before the new vessel was finished a preliminary crew was assembled.

In performing this task the following steps were used: (1) a job analysis of the duties required of each individual on the vessel was completed; (2) specifications were written for these jobs; (3) individuals to be assigned to duty were tested; (4) all were interviewed; (5) in special cases re-interviews were given; (6) on the basis of the evidence secured the individuals were classified as suitable for certain jobs; (7) placement of the men was ordered on the basis of the evidence collected; and (8) adequate personnel files were organized.

After these processes had been carried out, and the New Jersey had been commissioned, the personnel procedures were shifted to education and training, counseling, discipline, promotion, the testing of the success of initial classification procedures, and the continuation of the utilization of the job

analysis and selection procedures for necessary replacements.

The tests used included some examinations very similar to those used in selecting you as successful candidates in this Talent Search. This involved the giving of a general classification, that is, a general intelligence test.

Examinations in reading and arithmetic were administered. Speaking tests to determine telephone communications ability on shipboard were taken by all. Vision tests including capacity for the stereo-vision necessary in the use of certain optical instruments used on shipboard, and night vision tests were given. A so-called "psychiatric inventory" was organized and administered to attempt to screen out those individuals whose personalities were most apt to bring them into later difficulty.

By using modern sorting techniques after these testing and interviewing procedures had been carried out, the entire ship's company was organized about two weeks before the New Jersey was placed in commission. Officers and men in this way became familiar with each other before shipboard duties began.

Operations Test Effectiveness

Thus, in Captain McDowell's words, "At the stroke of a bell, at 1230 on 23 May, 1943, a unit of the fleet, sixty thousand tons, two thousand eight hundred men, two hundred and twenty-five thousand horsepower, radio, radar, galley, stores, laundry, post office, sick bay, went into action, and from that second on functioned in accordance with law, regulation and U. S. Fleet directive."

The success of this program was attested by the effectiveness of the new vessel at sea. It is a matter of record that after a long successful period at sea the New Jersey again entered an American port for five days of recreation and liberty. Every man was off ship at some time. At the end, no single man was absent over leave, and no illness was contracted during the leave period.

I have taken these examples to show that personnel procedures when applied in a concrete situation, old and new, can be successful. In the beginning of this address I

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suggested that science was concerned with the future and not the past. Today new techniques are available and are still being developed by means of which young men and women with all sorts of aptitudes can be advised more wisely than was ever true before.

Thus young men and women with the many skills and abilities required by our nation can receive proper education and training. This means that in the future young men and women with the help of their parents and teachers can make wiser selection of a life's work than was formerly the case. Thus new and satisfied workers can be fitted into the ever changing pattern of the economic and free social life of our republic.

Widespread Use Urged

Yes, this Annual Talent Science Search is typical of the future and not of the past. It foreshadows the part that science is bound to play in the years ahead in helping free American boys and girls to select and be educated for proper vocations and professions.

Let me express the hope that those of you here tonight, as you become great and outstanding physicists, engineers, chemists, or other experts, will continue to remember the importance of supporting the use of scientific methods in guiding and advising free American citizens.

Proper manpower utilization alone will allow our nation to maintain its strength. By such utilization we can become more individually productive and also have to the greatest degree possible, the personal satisfactions that come from performing well the tasks in society which we have selected and for which we are well fitted.

Thus the proper solution of manpower problems by our country will in the future allow more and more people to experience the deep satisfactions that come from effective teamwork and the real accomplishment of specialized tasks in our free society.

Therefore, again, to you who have participated in a most personal way in a successful manpower selection program, I give you my warmest congratulations and best wishes for effective and productive lives as

professional scientists. May your future educational success and your continued scientific research activities be more than worthy of the outstanding promise that you have already shown.

Science News Letter, March 7, 1953

BIOPHYSICS

First A-Bomb Survivors Live "Life of Reilly"

► SOME OF the injured survivors of the first atomic bomb explosion in history, at Alamogordo, N. Mex., July 16, 1945, are now living the "life of Reilly" entirely at government expense.

They are six or seven cattle that suffered radiation burns on their skins because they happened to be 15 or 20 miles away when the big bomb went off. About 40 of them, two bulls and the rest cows, were rounded up by the Atomic Energy Commission after the explosion for observation and experiment as to any possible lasting effects, to them or to their young.

There were no lasting effects, Dr. Cyril T. Comar, laboratory director and research coordinator of the University of Tennessee-Atomic Energy Commission farm, Oak Ridge, Tenn., told SCIENCE SERVICE.

In the first years after the Alamogordo bomb, the cattle were given quite a going-over, Dr. Comar says. The radiation burns were the result of the "fall-out" of radioactive particles from the vast cloud produced by the A-bomb. They did some damage to the hair follicles and to the pigmentation of the skin, but the effects did not penetrate below the skin, Dr. Comar says. The only result is that they have patches of gray hair where the burns were.

Young were bred from the cattle exposed to the bomb, Dr. Comar reports. The young were no different, either in quantity or quality, from the young of normal cattle from the same general area.

Now many of the calves are being used for other research on the farm. All except six or seven of the original cattle have either been sold or have died.

"We look at the original survivors once in a while," Dr. Comar says, "but otherwise we don't pay much attention to them any longer."

Science News Letter, March 7, 1953

PALEONTOLOGY

Dawn Age Fossils Clue to Primate Past

► THE BONES of a 60,000,000-year-old "dawn age" primate, possibly a link between monkeys and the lesser animals, have been moved to the Smithsonian Institution from southwestern Wyoming, where they were discovered.

The lemur-like animal, an undescribed species of the extinct genus *Notharctus*, was about the size of a Rhesus monkey and probably lived in trees, the Smithsonian Institution said.

Fossil primates are rare but valuable finds to students of prehistoric life, the paleontologists. The animal group of primates includes lemurs, monkeys, apes and man himself, and so primate fossils throw light onto the evolutionary history of man.

Bones rarely become fossilized in forested areas; and as primates are mostly tree-dwellers, prehistoric remains of them are not often found. Primate fossils in temperate North America are only found in any numbers from Eocene deposits of 60,000,000 years ago, representing a time when tropical conditions existed here.

Science News Letter, March 7, 1953



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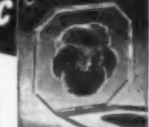
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What GENERAL ELECTRIC People Are Saying

E. S. LEE

Public Relations Division

RECOGNIZE THE ENGINEER: In engineering, the product's the thing. It is the product around which everything moves and toward which everything is directed. The scientist brings forth new knowledge from nature; the engineer forms that knowledge into products for people to have and to use. The engineer may improve present products or create new ones.

This is what makes engineering universal; this is why engineers are in the forefront of every advance.

Yet the man who uses the products does so without thinking of the engineer who produced them. Little does the user know who created the idea in the first place, how it got into its present form, who will make it even better in the days to come, or how it is produced in ever-greater quantities through the design of even-better production tools. All he knows is this: he has the product and it gives him satisfaction. The engineer is not spontaneously recognized.

The engineer has been so busy doing things that he has not brought his story to the people of our country. Therefore they do not recognize the importance of his story, and thus far his recognition has been a problem for him alone. But today the seriousness of our world situation has taken the problem out of his hands. It is now a problem for the nation—engineers must be conserved for engineering, and their numbers must be increased.

This demands an earlier understanding of the engineer by the public at large. It demands that he receive the recognition due him in substantial degree. It demands that military assignments be made only for necessity in technical matters. It demands that secondary-school curriculums be complete with the necessary physics and chemistry and mathematics to provide the best training for those entering engineering schools. And it demands that those young people capable of advancing in engineering be eager to tackle the hard work which the training requires.

There is an imperative need for this understanding if our nation is

to advance its present world position. The creative ability of the engineer is meeting its greatest challenge. But now the engineer must create another new product: a universal and spontaneous recognition of the engineering profession.

General Electric Review



S. P. NEWBERRY

General Engineering Laboratory

In the early excitement of the electron microscope, research workers joined in a mad rush to obtain higher and higher magnification pictures. Nearly five years elapsed before it became generally recognized that magnifications of 10 to 100 thousand times were far too great to correlate results with previous magnifications, usually less than one thousand times.

A practical idea of the difference in magnification can be gained by considering the $\frac{1}{8}$ -inch, 200-mesh specimen grid of the electron microscope. At 1000 times magnification its image is 10 feet across, and a single mesh opening is approximately 2" square. Now at 100 thousand times magnification the screen is more than $\frac{1}{5}$ -mile across and the individual mesh opening is over 17 feet. An 8" x 10" picture obtained at 100 thousand times represents a sampling of only .2% of the area of a mesh opening and only 2/100,000% of the tiny $\frac{1}{8}$ " specimen we started out to explore. Experience has taught us that we must increase magnification in gradual steps of about 3X per step if we are to form a definite conclusion of how the minute structures are correlated with the over-all structure. Indeed, when we change methods of viewing or methods of specimen preparation, it is often necessary to compare pictures at the same magnification, actually

superimposing identical fields of view, so we may maintain continuity with past knowledge.

After finding out that the highest magnification is not always the best, the electron microscopist has another important lesson to learn. He must realize that he cannot live in an "ivory tower," solving problems by crystal gazing in his microscope. He must work with the people who have the problems in the shop. He must help them to choose and prepare samples, and they must help him interpret what he photographs. He should encourage the use of other equipment to support or check his own findings. The electron microscope adds the very important element of vision to problems which depend upon the ultrafine structure of matter, but it does not give all the answers by itself.

7th National I.S.A. Meeting
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G. A. MAYORAL

Electronics Division

THE FUTURE OF TELEVISION: UHF television—which is essentially television in a new segment of the radio spectrum—presents a challenging opportunity to American ingenuity both in engineering development and from the standpoint of programming, education, and commercial enterprise. No longer will telecasting be limited by unavailability of frequencies, but the limit on the number of TV stations will rather be placed on the ability of the broadcaster to obtain his fair share of the audience. UHF TV makes possible a truly competitive system of telecasting in accordance with American democratic principles. It will some day blanket the country with reliable television signals from thousands of television towers.

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AERODYNAMICS OF PROPULSION—Dietrich Küchemann and Johanna Weber—*McGraw-Hill*, 340 p., illus., \$9.00 Including jets, ram-jets and turbo-jets.

ANHYDROUS AMMONIA AND AQUA AMMONIA CHEMICAL SAFETY CHART—U. S. Bureau of Labor Standards, wall chart, illus., paper, free upon request to publisher, Washington 25, D. C. Description and directions for safe handling, storage and shipment.

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APPLICATION OF OPTICAL INTERFERENCE TO THE STUDY OF RESIDUAL SURFACE STRESSES—Harold R. Letner—*Mellon Institute*, 13 p., illus., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh, Pa.

ATLAS OF MEDICAL MYCOLOGY—Emma Sadler Moss and Albert Louis McQuown—*Williams and Wilkins*, 245 p., illus., \$8.00. To aid in the diagnosis of fungus disease.

BEDSIDE DIAGNOSIS—Charles Seward—*Livingstone (Williams and Wilkins)*, 2d ed., 380 p., illus., \$3.50. Designed to give medical students and doctors a method of systematic approach to diagnosis from the symptoms presented by the patient.

BIBLIOGRAPHY OF BOOKS FOR CHILDREN—Leland B. Jacobs, Compiler—*Association for Childhood Education International*, 103 p., paper, \$1.00. Listing more than a thousand titles including old favorites and the best books for children published through May, 1952. Books are classified according to content.

CAPTIVE SURGEON: Adventures and Misadventures of a Doctor in Red China—Ernest M. Lippa—*Morrow*, 280 p., \$4.00. The experiences of an Austrian physician who acted as head surgeon at the Catholic hospital in Kaifeng, and later went to Luau in Communist territory.

COLLEGIATE EDUCATION FOR NURSING—Margaret Bridgman—*Russell Sage Foundation*, 205 p., \$2.50. The Russell Sage Foundation instituted in 1949 a temporary counseling service available to colleges and universities that wished to improve schools of nursing. Dr. Bridgman gave the service.

CYTOCHEMISTRY: A Critical Approach—J. F. Danielli—*Wiley*, 139 p., illus., \$4.00. The author explains that this is not a textbook (cytochemistry is so undeveloped that a textbook would be premature) but it is a record of his own experiments and those of his associates.

EDUCATION IN SWEDEN—Alina M. Lindgren—*Gott. Printing Office*, Office of Education Bulletin 1952 No. 17, 90 p., illus., paper, 30 cents. The Swedish school reform act of 1950 provided for a 9-year compulsory comprehensive school. This study will enable American administrators to evaluate the education of pupils from Sweden.

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ENCYCLOPEDIA OF CHEMICAL REACTIONS Volume V—C. A. Jacobson with assistance of Clifford A. Hampel and Elbert C. Weaver, Eds.—*Reinhold*, 787 p., \$15.00. The senior editor unfortunately died before he could complete this multi-volume series, but the publication of the alphabetical list of the elements is being continued under the same editorial policy. This volume includes nickel to ruthenium.

THE FELLOWSHIP SYSTEM OF SCIENTIFIC RESEARCH AT MELLON INSTITUTE—George D. Beal—*Mellon Institute*, 12 p., paper, free upon request direct to publisher, 4400 Fifth Avenue, Pittsburgh, Pa.

HARMONICS, SIDEBANDS, AND TRANSIENTS IN COMMUNICATION ENGINEERING: As Studied by the Fourier and Laplace Analyses—C. Louis Cuccia—*McGraw-Hill*, 465 p., illus., \$9.00. A textbook intended to give communications engineers an understanding of the mathematics they need for their profession.

HUMAN FACTORS IN AIR TRANSPORTATION: Occupational Health and Safety—Ross A. McFarland—*McGraw-Hill*, 830 p., illus., \$13.00. Safety of air travel depends on the health of the pilot as well as on the design and construction of the plane.

HYDROCHLORIC ACID, AQUEOUS AND HYDROGEN CHLORIDE, ANHYDROUS CHEMICAL SAFETY CHART—U. S. Bureau of Labor Standards, wall chart, illus., paper, free upon request direct to publisher, Washington 25, D. C. Description, shipping containers, storage, safe practices and handling instructions, including first aid.

INNOVATION: The Basis of Cultural Change—H. G. Barnett—*McGraw-Hill*, 462 p., \$6.50. There is, the author believes, no innovative "faculty" nor is there any specifically creative instrument possessed by some men and not by others. A new idea is the result of a particular conjunction of psychological processes. Based on research with five ethnic groups.

INSECT, FUNGUS AND WEED CONTROL—E. R. de Ong—*Chemical Publishing Co.*, 400 p., illus., \$10.00. Recommendations of recognized authorities, and data on important research still in experimental stage.

MACHINES AT WORK—Mary Elting—*Garden City Books*, 93 p., illus., \$1.50. For the small boy and his father who love to watch the crane and bulldozer at work.

MAPS AND MAP-MAKERS—R. V. Tooley—*Crown*, 2d ed., 140 p., illus., \$7.50. The history of map-making beginning with the map drawn by a Babylonian cartographer on clay in the fifth century B.C.



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NEW TEETH FOR OLD—Victor H. Sears—*Mosby*, 2d ed., 110 p., illus., \$3.00. A book for dentists and their patients on how to prevent the need for false teeth and, after you have them, how to wear the dentures with the greatest comfort.

PHARMACOLOGY AND TOXICOLOGY OF URANIUM COMPOUNDS: Chronic Inhalation and Other Studies Parts 3 and 4—Carl Voegtlin and Harold C. Hodge, Eds.—*McGraw-Hill*, 2 vols., 2466 p., illus., \$18.00. The completion of these studies has made possible the well-supported recommendation of air concentrations of soluble and insoluble uranium dusts that men may breathe safely. Provisionally, this highly toxic metal is not easily absorbed.

PHOTOGRAPHY WORKBOOK—Victor C. Smith—*Lippincott*, 84 p., illus., paper, \$1.20. Graded lessons for beginners.

QUALITATIVE ANALYSIS AND ANALYTICAL CHEMICAL SEPARATIONS—Philip W. West, Maurice M. Vick and Arthur L. LeRosen—*Macmillan*, 223 p., \$3.75. A beginning text prepared from a new non-sulfide approach.

REAR LIGHTS OF MOTOR VEHICLES AND PEDAL CYCLES—R. L. Moore—*Her Majesty's Stationery Office*, Road Research Technical Paper No. 25, 21 p., illus., paper, 40 cents. The accuracy with which the distance of a vehicle at night could be judged was found to depend on the intensity and the height of the rear lights. Some 3,400 casualties are caused each year by faulty lights.

REPORT OF THE ROAD RESEARCH BOARD WITH THE REPORT OF THE DIRECTOR OF ROAD RESEARCH FOR THE YEAR 1951—Department of Scientific and Industrial Research—*Her Majesty's Stationery Office*, 86 p., illus., paper, 90 cents. Road accidents cost the people of England more than one hundred million pounds.

THE SECOND ANNUAL REPORT OF THE NATIONAL SCIENCE FOUNDATION, Fiscal Year 1952—Alan T. Waterman, Director—*Govt. Printing Office*, 77 p., paper, 30 cents. Showing what the Foundation has accomplished despite inadequate budgets.

THE SUN—Herbert S. Zim—*Morrow*, 64 p., illus., \$2.00. Sunspots, eclipse and the part the sun plays in our everyday lives are explained for children.

WHAT IS SCIENCE?—Norman Campbell—*Dover*, 186 p., paper \$1.25, cloth \$2.50. A philosophical discussion of the nature of science, both "pure" and applied.

Science News Letter, March 7, 1953

The Mathematics Magazine

bridges the gulf between ordinary interest in mathematics and research work.

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Questions

CHEMISTRY—Why is it important to understand the structure of proteins? p. 150.

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ELECTRONICS—How can blood flow rate inside the body be measured without surgery? p. 149.

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MEDICINE—Why is there no reason to worry about black market gamma globulin? p. 151.

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How could recorded messages be speeded up? p. 152.

...

Photographs: Cover, Fremont Davis; p. 147, U. S. Army; p. 149, U. S. Air Force; p. 151, Lockheed Aircraft Corp.; p. 160, Eastman Chemical Products, Inc.

Do You Know?

A hairpin weighs a little less than 1/100 ounce.

The wireworm, larval form of the click beetle, is one of the more destructive pests of potatoes.

Every minute, on the average, about 130 tons of finished steel products were shipped by the steel industry during 1952.

Optimum temperatures for the growth of decay-producing fungi range from 60 to 80 degrees Fahrenheit, but some fungi can develop at temperatures as low as 35 or as high as 120.

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❁ **MOISTURE CONDITIONER** for the home takes the stickiness out of air in the summer and adds moisture to dry air in the winter. Operating from ordinary 115-volt a.c. electric power, the unit stands about two feet high, weighs 50 pounds and is 16 inches in diameter. When dehumidifying, it takes three gallons of water out of household air a day. When humidifying, it adds two gallons to the air a day.

Science News Letter, March 7, 1953

❁ **ELECTRONIC COUPLER** of UHF and VHF television antennas uses a silver printed circuit sealed in a plastic case. The unit can join up to two ordinary VHF antennas with one UHF antenna. It feeds the television set through a single transmission line running from the coupler.

Science News Letter, March 7, 1953

❁ **CATCH-ALL CABINET** consists of 8 to 24 small, labeled drawers designed to hold tacks, bobby pins, pins, stamps, paper clips and other small items that clutter desks, work tables and vanities. The sturdy, steel, rubber-footed cabinet frame slips into a space only 6 inches deep and 12½ inches wide. It can be obtained in heights varying from about 4 to 12 inches, depending upon the number of drawers.

Science News Letter, March 7, 1953

❁ **SPACE HELMET** made of shatterproof cellulose acetate plastic, as shown in the photograph, should please little boys and



girls who belong to this age of imaginary space travel. The clear dome-like helmet has openings in the front and rear for ventilation, but a bright red inflatable plastic collar, air hose and two oxygen tanks lend a realistic touch.

Science News Letter, March 7, 1953

❁ **PHOTOCOPYING MACHINE** for offices is scheduled to be marketed within the next few months. Completely automatic, the unit is small enough to be placed

on a desk without cramping the office worker. It turns out a black-and-white photocopy of the original in 30 seconds, and will handle papers up to 11 x 17 inches in size.

Science News Letter, March 7, 1953

❁ **FILM-DEVELOPMENT CALCULATOR** provides amateur and professional photographers with a quick, easy way to figure development times for different films in different developers at different temperatures. This lets the darkroom worker develop his films scientifically to the exact contrast (gamma) he desires.

Science News Letter, March 7, 1953

❁ **ELECTRIC SHAVER** outfit consists of a small unbreakable mirror and a shaver that operates from three ordinary flashlight batteries. The kit is packaged in a pigskin travel case that withstands the rugged use of sportsmen. The shaver can be adapted to plug into automobile cigarette lighter receptacles. It draws only one-tenth the current of an automobile radio.

Science News Letter, March 7, 1953

❁ **BRUSH-ON SOLDER** paste can be used to join all common metals but aluminum and magnesium in the flame of a cigarette lighter or a candle, the manufacturer states. The paste is reported to be especially good for emergency repairs around the house.

Science News Letter, March 7, 1953

• Nature Ramblings •

➤ **WINTER-WEARY FOLK**, looking for the first robin, the first crocus, the first lilac leaves, are also likely to be greeted by other signs of spring that are not so welcome. Flies, for example.

The first few scouts of the fly hordes, that you see while outdoors is still chilly in the daytime and frosty at night, are most probably not new flies but old ones—hangers-on that have hidden away in attic crannies and other out-of-the-way nooks during the winter, most of the time numbed into immobility by the cold but still managing to stay alive.

Yet they are quite capable of propagating their evil kind, so now is the time to annihilate them, before they become too numerous to deal with by anything so elementary as a swatter. A swat in time now may save nine millions in July.

Appearance of these straggling advance guards should be sufficient warning to you to look to your anti-fly defenses while the

Stop 'Em Now!



season is yet young and before the main forces of the enemy arrive. Now is the time to get your screens out of storage, brush them off, and see if there are fly-size leaks in them.

Remember, it doesn't take much of a hole in a screen to let a fly through: their mesh is designed to be just about enough to stop a fly or an ordinary mosquito, so one or

two broken or pushed-aside wires constitutes a practicable breach.

Unless your screens are of copper or other non-corroding metal, paint them. That will do much to insure continued security against the persistent enemies, who will be trying to sneak into your house as long as warm weather lasts.

Do not mix DDT with your paint. This was an early recommendation that looked very promising for a time; but the very quality that makes paint good—a tight, tough, elastic outer film—is the wrong thing for DDT, because it seals it in and does not release it rapidly enough to do the flies any harm. The thing to do is paint your screens, then, after the paint has well dried, brush or spray them with a residual-type DDT preparation—there are plenty of the latter on the market now, each with its own merits, as the labels and advertising matter will not neglect to tell you.

Science News Letter, March 7, 1953